



HIGHLY PATHOGENIC AVIAN INFLUENZA IN INDIA: A SITUATIONAL ANALYSIS

RAISE SPS COUNTRY DIAGNOSTIC REPORT #10

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The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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EXECUTIVE SUMMARY

The February, 2006 confirmation of highly pathogenic avian influenza (HPAI) H5N1 virus in the state of Maharashtra set the Government of India and state of Maharashtra preparedness planning teams in action. Some questions remain regarding delays in the official declaration. However, the Government of India's (GOI) rapid and effective response to the initial outbreak was generally given high marks by the private sector, including the poultry industry. To date, additional reported outbreaks detailed in this report have been confined to northwest Maharashtra, the site of the original outbreak.

This study finds that the animal laboratory system has posed the greatest constraint in establishing an efficient animal/bird surveillance and monitoring system. To date, the high security laboratory at Bhopal is the only designated laboratory for official confirmation that H5N1 HPAI exists. Following the first three months of program implementation, it is clear that adjustments need to be made to the system for testing and screening samples at regional laboratories.

The lack of an effective media strategy from the onset of the outbreak has been disastrous for the poultry sector itself. Actions such as taking poultry products off menus at Parliament and other high-profile institutions drove the rapid decline in the demand for all poultry products. Such actions underlined the lack of systematic collaboration between the GOI and key representatives of the poultry industry, the most rapidly growing sub-sector of the agricultural economy over the past decade (through the end of 2005). The government's increased understanding of the value of public/private partnerships present new opportunities. As delineated in this report, public/private collaboration will be key to strengthening bird flu monitoring and surveillance, containment, and eradication, and will be crucial for rebuilding the industry.

The major task of this team was to recommend areas for USAID investments in future programming for AI. The vast majority of resources, experience, and expertise within the USG agencies including USAID are in the area of human health. USAID has a long and productive history in India in areas related to infectious diseases and a broad array of human health issues. Along with the Health and Human Services Agency and Centers for Disease Control, the human health elements of HPAI/bird flu are receiving increased attention from combined USG agencies. In contrast, USAID has virtually withdrawn from agriculture in recent years. The requirements for developing a rapid, effective contribution to Indian and other donor efforts at controlling/containing further outbreaks of bird flu has become the major focus of this report. This was reinforced when the human health expert member for this assessment team was unable to obtain an Indian visa.

BACKGROUND

The recent spread of H5N1 highly pathogenic avian influenza virus (HPAI) from Southeast Asia to Eurasia, Europe, Central and South Asia has heightened concerns about the potential for this disease to lead to a worldwide influenza pandemic. While the virus has the ability to jump the species barrier, experience from South East Asia and their recent track record in substantively containing the disease for the time being provide important lessons learned for other countries in the region. Critical lessons include establishing ever improving preparedness planning, surveillance and eradication/control systems with feedback loops on lessons learned from previous efforts and experience. Thailand, in particular, has become very aggressive in improving their in-field AI containment and eradication operations. They have reported no new outbreaks for more than six months following widespread outbreaks in 2004-05 which devastated their poultry industry.

National governments, international and bi-lateral donor agencies have significantly increased their investment in preparedness planning and allocation of resources for containment and eradication measures for controlling Avian Influenza (AI) outbreaks during the past year. Preparedness planning for the potential outbreak of HPAI in India began in early 2004 but accelerated in 2005 as the bird virus was confirmed in more countries in Eurasia and Africa. The Directorate General of Health Services prepared a Contingency Plan for Management of Human Cases of Avian Influenza (published in December, 2005), and the Department of Animal Husbandry, Fisheries and Dairy (DADF) prepared a plan entitled “India Country Program for Preparedness, Control and Containment of Avian Influenza: Animal Health Component.” By early 2006, these planning preparations were put to the test.

The Government of India officially reported the initial outbreak of the H5N1 virus in the Navapur Taluka of Nandurbar District, within the western state of Maharashtra on February 18, 2006. The announcement followed several weeks of informal reports of unusual morbidity in commercial poultry flocks and investigations by state and local animal health officials. The rapid response teams (from both the animal and human health agencies of the GOI) received high marks for their immediate implementation of control/ containment measures as well implementation of compensation packages for affected farms. The one area which has been a major constraint from the beginning has been the system of laboratories for monitoring and testing bird samples for detection of the H5N1 virus. The high-security animal laboratory at Bhopal has been the only officially designated laboratory to confirm the existence of the H5N1 HPAI.

TERMS OF REFERENCE AND METHODOLOGY

The principle objectives of this assignment were the following:

- Assess the current situation of Highly Pathogenic Avian Influenza (Bird Flu) in India;
- Review and evaluate the effectiveness of USAID/India’s programming for HPAI; and
- Advise USAID/India on future involvement in HPAI control.

Recommendations for USAID programming were to follow the operating principles contained in the *USG’s Emergency Response to Avian Influenza Plan of Action*, specifically:

- Focus on activities that could contribute immediately to the containment of HPAI;
- Build on existing platforms and capabilities; and
- Promote a comprehensive and well coordinated response covering animal and human health.

Mr. Christopher Barrett, USAID Infectious Diseases Specialist within the USAID Office of Population, Health and Nutrition (PHN) provided leadership and guidance to the DAI team throughout the assessment. Dr. Massee Bateman, Chief of Maternal, Child and Urban Health Division also provided insights and guidance to the team. Both provided excellent briefing on USAID's current responses to HPAI issues including USAID's approach and lessons learned on preparedness and planning, surveillance, rapid response, communications, stockpiling of reagents, PPE, and possible donors, partners and platforms that the team could interact with in fulfilling our objectives.

For the balance of the first week, the team met the heads or their representatives of DFID (Department for International Development, British High Commission, Ms. Ranjana Kumar and Mr. Ken De Souza), EC/EU (European Union, Ms. Frederika Meijer and Ms. Barbara Kirsten), WHO India (Drs. S. K. Krishnan and Sarkar), WHO /SEARO regional (Drs. S. Salunke, K. P. Singh and J. P. Narian), UNICEF (Mr. M. Galway and others), World Bank (Mr. M. Van Nieuwkoop, Prof. P. Berman, and Drs. G. Kurup and V. Kumar) and FAO (Mr. D. Gustafson and Dr. M. Oberoi). Follow-up meetings and/or phone conversations were necessary on occasion to get updates or clarification on particular issues. The FAO, World Bank, and WHO have been working closely with the GOI in providing support for logistics, plans, technical assistance, etc. For example, World Bank is considering providing millions of dollars to GOI to improve the infrastructure of laboratories, particularly for upgrading the five regional laboratories in various aspects such as facilities, equipment, reagents and test kits for HPAI. They also propose to provide funding to hire and train personnel in five regional laboratories strategically located in different parts of India. The speed of testing poultry samples for AI is a huge limiting factor, as the High Security Diagnostic Laboratory in Bhopal is the sole testing laboratory in India.

In the US embassy, the team met with people in various sections such as USDA (Mr. Chad Russell, Mr. M. Riedel and Dr. S. K. Singh), the USAID Economics and Agriculture office (Mr. Larry Paulson and Mr. A. Mukherjee), the Science office (Dr. D. Brown and Dr. A. Lal) and the CDC Country Director (Dr. D. Warren). These individuals provided valuable information on how their offices have been involved in assisting GOI regarding handling of AI in poultry and on the human side as well. However, most felt that it was a "big puzzle" to figure out how to work and co-ordinate various activities between these units within the US embassy including USAID/India and between various agencies in the United States Government such as USAID/Washington, USDA/Washington, Health and Human Services (HHS) including the Centers for Disease Control (CDC) and the Department of Defense. It is interesting that except for two animal health consultants, one each in FAO and World Bank, none of the World bodies and the sections in the US embassy including USAID have any animal health experts on staff. One of the recommendations made to USAID was to hire an animal health expert either locally for India or regionally for SE Asia (Bangkok). Having a person on the ground to deal with various issues on bird flu could make a big difference.

The team also met with numerous persons representing various businesses within the poultry industry. The team had several in-depth discussions with Mr. Shashi Kapur, President of the Poultry Federation of India. Mr. Kapur is also a poultry producer and a vaccine manufacturer. He was most gracious with his time and provided us with excellent suggestions, such as stressing the immediate needs for providing information, communication and education to the public, to the media, to the farmers, and to others regarding the facts about bird flu. The team also met Mr. O. P Singh, CEO, and Dr. S Ghosh, General Manager of Venkateshwara Enterprises, which comprises 90 % of layers and 65 % of broilers in India. Venkateshwara also makes vaccines for poultry and has many veterinarians on staff. Other industry representatives interviewed included Dr. Sunil Sharma, Veterinarian for Hubbard, Dr. Sanjay Anand, Technical officer for Fort Dodge Biologicals India, Mr. Amit Sachdev, Indian representative for US grain council, Mr. Shanmugam who had worked for USDA in the US embassy, Drs. Srivastav and Kumar of Pioneer Hatcheries, and others.

Discussions with these industry representatives indicated that AI has led to the virtual collapse of the Indian poultry sector because people have stopped eating chicken meat and eggs due to fears of contracting bird flu. The sharp decline in demand for poultry products was not helped when the Indian Parliament, Railways and the Airlines stopped serving chicken in the midst of a media blitz when the outbreak of bird flu was announced on February 18th, 2006. In light of these events, the president of PFI, Mr. Kapur, commented that, “It is not the bird flu that is killing the chickens in India, but it is the media.” It was also interesting to note that some people in the industry and institutions did not believe that there was bird flu in India. They felt a hoax was created by the media or the Government or both. Most of the industry felt that the State and GOI responded admirably to the flu outbreak. However, there were indications to suggest that there was little cooperation between the private and public sectors. There were also suggestions that there are few legislative measures to regulate the poultry industry. Those regulations that are in place are not consistently enforced for a variety of reasons. It was also interesting that animal husbandry issues such as avian influenza are ‘State Issues’ under the Indian Federal Structure. The GOI provides policy and guidance regarding how to handle such situations and they declared no ‘emergencies.’

The team also met GOI officials, Mrs. Upma Chawdhry, Joint Secretary, Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture; Dr. Ganguly, Director of Indian Council for Medical Research (ICMR); Dr. Kant, Deputy Director ICMR; and Dr. V. K. Taneja Deputy Director General (Animal Sciences) of the Indian Council of Agriculture and Research; Dr. A. C. Mishra, Director, National Institute of Virology in Pune; Dr. P. Doke, Director of Health Services, State of Maharashtra and Dr. R. Katti, State Nodal Medical Officer for the State of Maharashtra. Unfortunately, the team was unable to meet the District and State Animal Husbandry commissioners for the State of Maharashtra, who were occupied with the bird flu situation in Maharashtra. Dr. Shiva Prasad did make contact with Dr. Bijoy Kumar, the district commissioner, in charge of the stamping out mission. He was camping out at the site of bird flu outbreak and was reassuring that things were going well and that they would control the outbreak soon.

While in Bombay, Dr. Prasad met faculty (Drs. Ranade, Vaidya, Nehete and Sherikar) at the Bombay Veterinary College, one of the oldest and most prestigious colleges in India. Their assessment was that there has been no cooperation between the state and the colleges and that there was no research going on related to AI. In Bombay, the team also met Dr. A. Rahmani, Director of Bombay Natural History Museum and learned that nobody had contacted him for his help to do surveillance for AI in migratory birds. He would be willing to help, if asked by the state or GOI. In Pune, the team had a long discussion with young and dynamic Dr. T. Mundkur, the coordinator for Wetlands International —South Asia. He shared with the team the various fly ways in Asia through which the bird flu could have been introduced to India by migratory birds, even though he discounted it quite strongly. He was also willing to work to help the state and the GOI regarding exploring the role of migratory birds in the spreading of bird flu. While in Bombay the team also had a brief meeting with Mr. K. Green and Ms. T. Chilimbi of the US consulate regarding AI issues.

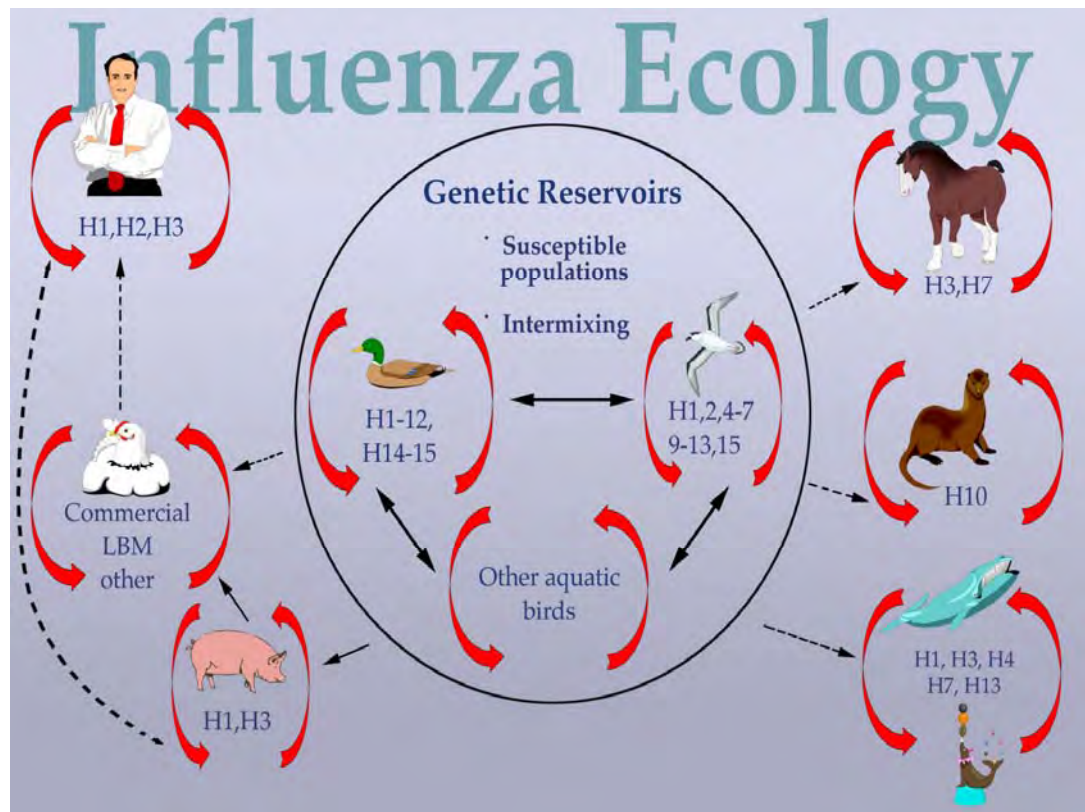
Following the field trip to Pune and Bombay, in New Delhi the team had follow-up meetings with Dr. M. Oberoi of FAO and the WB team to further investigate potential areas of cooperation for future USAID funding on the animal health issues. The team’s final recommendations include specific mechanisms for working with these two organizations.

During the first 10 days of this consultancy the team was expecting a human health expert to join the team. This person was never issued an Indian visa, so this plan was dropped halfway through the consultancy. Thus, many of the meetings established were also focused on the human health side of AI issues but this report is heavily slanted toward the actions required to contain further spread of AI from an animal health perspective.

BIRD FLU—H5N1 HIGHLY PATHOGENIC AVIAN INFLUENZA VIRUS (HPAI)—THE ECOLOGY OF AVIAN INFLUENZA

Bird flu or highly pathogenic avian influenza (HPAI) is an acute, systemic, lethal and rapidly spreading disease of poultry caused by type A avian influenza (AI) virus, H5N1. Bird flu is a disease of great economic significance in poultry. The outbreak of highly pathogenic influenza in poultry due to H5N2 virus in Pennsylvania during 1983 and 1984 cost the United States Department of Agriculture more than \$60 million to eradicate the disease. The H5N1 strain of AI also poses a significant threat to humans who come in contact with infected poultry or water fowl, as evidenced by approximately 200 people that have been infected with this virus out of which 115 have died since 1997, mostly in South East Asia.

FIGURE 1: ECOLOGY OF AVIAN INFLUENZA (COURTESY: DR. DAVID SWAYNE)



Avian influenza viruses belong to the family *Orthomyxoviridae* and are divided into subtypes based on surface glycoproteins, namely hemagglutinin (H) and neuraminidase (N). There are 16 H and 9 N distinct types of surface antigens on the viruses and all these types are found in avian species primarily in waterfowl. Based on these surface antigens avian influenza viruses are designated as H5N1, H1N1, H7N2, H9N2, H6N2, H4N6, *etc.* Migratory waterfowl and shore birds are the primary reservoirs of avian influenza viruses. Normally, no clinical disease due to AI viruses is seen in migratory waterfowl or the shore birds such as ducks, geese, swans, gulls, *etc.* The majority of the avian influenza viruses carried by the migratory waterfowl are not pathogenic to poultry except for certain strains such as H5N1, H5N2, H7N2, H7N7, *etc.* The pathogenicity of the virus in poultry not only varies with the strain of the virus such as H5 or H7, but also with the age and species of birds involved, nutritional and environmental factors and concurrent infections. It should be pointed out

that not all AI viruses of H5 and H7 are pathogenic, and that low pathogenic strains can become highly pathogenic. The incubation period for bird flu virus ranges from 5 to 15 days for poultry. Gallinaceous birds such as chickens, turkeys, quail, pheasants, partridges, guinea fowl and zebra finches are highly susceptible to bird flu, followed by geese, house finches, budgerigars, and ostriches. Bird flu has occasionally caused mortality in wild ducks, gulls, swans, starlings, egrets, herons, flamingos, etc. Among mammals, humans and tigers, leopards, cats, civets have also been found to be susceptible.

The primary mode of transmission of bird flu to poultry is through contact with infected carcasses, respiratory secretions, or feces. Contaminated feed and water, equipment, etc. can also contribute to the spread of the disease. Clinical signs in poultry due to bird flu include severe depression and decrease in feed and water consumption, swollen comb, wattles, head and legs, with occasional nervous signs. Pathology includes severe pulmonary edema and congestion and hemorrhages in various organs including legs, epicardium, proventriculus, intestine, etc. A tentative diagnosis of bird flu can be made based on clinical signs and pathology. Virus isolation is necessary for confirmation of the disease but this may take 5 to 7 days. Therefore, molecular techniques (such as real-time RT-PCR) are used for detecting bird flu virus and the results can be obtained in a matter of hours. Various serological tests such as Agar Gel Immunodiffusion (AGID), Haemagglutination Inhibition (HI), Enzyme Linked Immunosorbent (ELISA) assays for detecting antibodies to bird flu virus and antigen detection tests can also be used for screening large number of birds for avian influenza. However, these tests will not be useful if the birds had been vaccinated for AI with any subtype such as H9N2, H5N2, etc.

One significant aspect of bird flu is that the virus has the potential to evolve into a form that is easily spread between people. This can happen when a human flu virus and a bird flu virus reassort and produce a hybrid. While there is no conclusive evidence at this time scientists hypothesize that genetic mutation could occur, which would result in a particularly virulent strain of AI that is capable of causing human infection on a pandemic scale. It is believed that 30-50 million people died during the 1918-19 “Spanish flu” H1N1 influenza virus. There were similar pandemics though to a lesser degree during 1957-58 due to the H2N2 flu virus and during 1968-69 due to the Hong Kong H3N2 virus.

The HPAI H5N1 virus that was first isolated in 1996 in the Guangdong province of China came to prominence in 1997, when 6 out of 18 people infected died in Honking. While the disease was controlled with massive culling of poultry, there was a resurgence between 2001 and 2003 in Hong Kong and China. Between 2003 and 2004, the disease spread to other countries in Southeast Asia, such as Korea, Vietnam, Indonesia, Thailand, Japan, Cambodia, Laos, and Malaysia. The disease was reported in 2005 in Russia, Kazakhstan, Mongolia, Romania, Turkey, and Croatia, and since the beginning of 2006, H5N1 has spread to more than 30 countries in the Indian subcontinent, Africa, the Middle East, and Western Europe.

BIRD FLU IN INDIA—A CHRONOLOGY

- **February 18, 2006:** Government of India (GOI) announced the outbreak of bird flu in commercial laying-type and backyard chickens in Navapur, of Nandurbar district in the state of Maharashtra, and in the adjoining region of Uchchhal taluk of Surat district in the state of Gujarat.
- **February 19:** GOI implemented the rapid response plan (RRP) of surveillance, eradicating and burying birds, disposal of feed, manure and eggs and, cleaning/disinfection of the premises within 3 to 10 kilometers of the initial outbreak. The farmers and owners of the birds were compensated promptly for their loss of birds at a standard price set by the GOI.

- **By February 27th** a total of 106,000 and 289,771 birds had been eradicated in Navapur and Uchchhal areas, respectively, and about 587,432 eggs destroyed.
- **March 15th**: GOI announced that bird flu had been diagnosed in backyard chickens in several villages of Jalgaon district in the State of Maharashtra. RRP teams were deployed for eradication of birds and containment of the disease.
- **March 30th**: GOI announced that bird flu had spread to backyard chickens in Ichchapur, of Burhanpur district, in the adjoining state of Madhya Pradesh.
- **April 6th** the disease had spread to backyard chickens in other locations within the Jalgaon district in the State of Maharashtra (see **Figure 2** below).
- **By April 12th** the disease had not been contained.

FIGURE 2: AVIAN INFLUENZA – SITUATION IN INDIA



It should be pointed out that even though the GOI announced bird flu in the chickens in Navapur on February 18th, the disease might have been present for several weeks or months prior to this. There are many reasons for this. First, the incubation period (from the time the birds acquire the virus infection to the time the birds develop clinical signs and eventual death) of the disease can take between 5 and 15 days depending upon factors such as poor nutrition, poor environment and the presence and management of concurrent diseases in the flock. Other factors in the delay of reporting bird flu include the time it took for (1) people to recognize the clinical symptoms and mortality of birds and their submission for proper postmortem analysis, (2) submission of samples to the only laboratory in Bhopal, which was directed to do the testing, (3) testing the samples to verify the

results, and (4) informing the officials in the Government of India, who in turn made the announcement confirming the presence of H5N1.

The onset of bird flu in chickens might have been further complicated by the wide spread use of H9N2 flu vaccine. Although the H9N2 flu vaccine may not prevent infection in chickens from bird flu caused by H5N1, it can slow the onset of clinical signs and mortality in a given chicken population. There were widespread rumors that the use of H9N2 flu vaccine in chickens was rampant in India since 2003. It should also be noted that the GOI made announcements of AI at different times, but it is probable that all these outbreaks were one large, contiguous outbreak.

SURVEILLANCE CONSTRAINTS

The GOI sent a directive to the Directors of Animal Husbandry & Veterinary Services of all the States to do surveillance in January and June of 2004, reiterating it again in November 2004. The directive requested the collection of random poultry serum samples from each state, which were to be sent to the Regional Diagnostic Disease Laboratory of the region for onward transmission to the High Security Animal Disease Laboratory (HSADL) in Bhopal for testing. In case of mortality in chickens due to an outbreak, the morbid material from such birds was suggested to be sent to the HSADL for confirmation. Due to the role of migrating birds in spreading bird flu sampling, it was encouraged that samples be collected from poultry in the vicinity of wild bird sanctuaries. However, it is not known if any migratory, wild birds or birds other than chickens were sampled for AI surveillance. In December, 2004 GOI banned the importation of poultry and poultry products from countries which had confirmed cases of avian influenza.

Due to the lack of infrastructure in the diagnostic laboratory system in India, only the HSADL laboratory in Bhopal was permitted to do the testing. As a result, the turnaround time for testing was too long, especially once there was an outbreak of AI in the Navapur region. Additionally, the types of samples, quality of samples and improperly packaged samples sent to Bhopal for testing either were not always suitable for testing or were of questionable significance. It is not known why some of the regional laboratories were not asked to perform simple screening tests for AI antibodies such as ELISA, AGID, and HI which are easy to do and would have alleviated the work load in the Bhopal laboratory. It is also not known whether or not the limitation of physical facilities, bio safety level, surge capacity, availability and technical know how of the personnel, and availability of test kits and reagents in the regional laboratories for testing such as antibody and antigen detection, RT-PCR and Real Time RT-PCR in the regional laboratories prevented them from performing the screening tests.

It is also interesting that Animal Husbandry issues, such as detection and control of AI, is a State issue under the Indian Federal Structure and that the GOI provides only guidance on policy and testing in this regard. Therefore, it is not known how each state handles surveillance, containment and eradication of AI.

VACCINATION FOR H5N1

In response to controversies over the vaccination of bird flu, the World Organization for Animal Health (OIE) and the Food and Agriculture Organization (FAO) have reiterated that the **slaughter of infected animals is the best way** of controlling and ultimately “stamping out” the disease. However, the OIE and FAO have acknowledged that this policy may not be either practical or adequate in certain countries for social and economic reasons or because of high viral challenge due to infection in villages, wild birds or domestic waterfowl. In such cases, countries wishing to eradicate the disease may choose to use vaccination as a complementary measure to the “stamping out” policy.

The OIE and FAO stressed that vaccines, if used, should be produced in accordance with the international guidelines prescribed in the OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals. Most vaccines used to date for bird flu have been inactivated whole AI virus antigens in oil-based, emulsion adjuvants produced according to OIE recommendations. These include a homologous vaccine such as H5N1 or a heterologous vaccine such as H5N2. The latter provides an opportunity to use a serological surveillance strategy to detect the circulation of a field virus through the detection of antibodies to the N subtype of the virus. This strategy is referred to as “DIVA” (Differentiation of Infected from Vaccinated Animal) approach. Circulation of viruses such as H6N2 and H9N2 and the use of vaccines such as H9N2, which are known to circulate in Asia and India, may interfere with the use of DIVA strategies. A live recombinant fowl pox virus with H5 AI gene insert vaccine has also been used in a few countries, but has yet to be licensed in many countries.

The OIE Terrestrial Code states that a country may be considered free from HPAI based on the absence of virus irrespective of whether vaccination has been carried out. Therefore, the two organizations confirm that the use of vaccines does not imply automatic loss of export markets. It has been shown that the use of such vaccines does not only protect healthy birds from disease, but also reduces the load of viruses excreted by infected birds. Thus the likelihood of bird-to-bird and bird-to-human transmission is reduced if accompanied by strict control measures such as surveillance, eradication of infected birds, animal movement control and observation of basic hygiene in animal production.

However, the decision of whether or not to use vaccines must be made by each country according to its own situation. The factors countries should consider in making their decision include their ability to detect and react to the disease as early as possible and the need for transparent and timely notification. This will have to be supported by a good institutional framework and sound legislative underpinning for veterinary services.

Any vaccination strategy should be developed in consultation with all stakeholders, including the private sector. The types of poultry and production sectors to be vaccinated must be determined and clearly documented. Infected poultry and those in contact with the virus should not be vaccinated. Vaccination should be carried out under the supervision of official veterinary services and be accompanied by a parallel surveillance strategy. This would make use of the capacity of the veterinary services to identify and monitor the circulating virus as well as the response to vaccination, which includes the use of non-vaccinated sentinel birds and the application of serological tests capable of differentiating infected from vaccinated animals. The GOI has procured sufficient quantities of inactivated H5N2 flu vaccine for poultry, but it has not been used to date.

ECONOMIC IMPORTANCE OF THE POULTRY SECTOR

The majority of attention surrounding the spread of avian influenza has focused on the public health threat of animal-to-human transmission. However, the South and Southeast Asian poultry industries have borne a tremendous burden from the destruction of poultry flocks and sharp decreases in demand for poultry products. The economic impact of avian influenza is extremely significant when considering the substantial growth of the poultry sector in Asia’s developing countries—particularly in India, China and Southeast Asia—during the past two decades. During this time, the rise in demand for poultry products has outstripped the growth of all other meat and fish products. Such growth has led to rapid increases in employment and income for participants in poultry production, processing and marketing industries, and also to considerable consumer benefits from falling real prices of poultry products.

The Indian poultry sector is nearly a \$7 billion per year industry, employing millions of persons both directly and indirectly in the production, marketing, processing and transport sectors. Growth in the sector during the past decade has been higher than all other subsectors of Indian agriculture. USDA estimates that India has sustained an accelerated annual growth rate in poultry meat production of 6% in the 1980s, 11% in the 1990s, and an estimated 19% from 1995 to 2005. By 2005, India ranked as the 6th largest poultry meat producer in the world as well as the 5th largest hen egg producer. The rapid growth of India's poultry sector has been fueled by rising domestic incomes and important structural changes in the industry. The key structural change spurring production growth has been the emergence of integrated production systems, which combine breeding, feed milling, contract growing, and processing and marketing activities. Productivity indicators in the commercial sector--broilers reach 1.8 kg in 6 weeks, feed conversion to meat ratios of 1.72 to 2.0, and egg production of 283 per/hen per year—all demonstrate the poultry industry has become a major contributor to the growth of Indian agriculture.

The outbreak of confirmed AI cases this year and the unfortunate failure to communicate adequately the real human health risk to the Indian public has struck a tremendous blow to the entire industry. Members of the Poultry Federation of India estimate a 30% decline in the demand for poultry products in the first three months of this year. Broiler prices in the New Delhi area have decreased 80% during this period. The situation worsened following the February confirmation of H5N1 bird flu when the Indian Parliament, Railways and at least one airline removed chicken products from their menus. Thus, the immediate objective of maximizing efforts to contain HPAI in current, affected areas and improving preparedness planning and surveillance programs in other likely locations is the absolute priority. Minimizing human health risks from expansion the virus along with creating confidence for the future rebuilding of the poultry industry in India is of the highest priority. As will be elaborated upon in the recommendations section at the end of this report, USAID, in collaboration with the WB and FAO and directed by the government of India, has an opportunity to program resources in support of these efforts.

PARTNERSHIP PROGRAMS AND COMPLEMENTARITIES

The World Health Organization (WHO) and the FAO have provided key assistance to the GOI in developing both the human and animal health components of national preparedness plans. Both UN agencies have brought lessons learned and the comparative experiences from South and Southeast Asia, where countries now have several years of experience in addressing H5N1 HPAI issues. WHO, both the South Asia regional and Indian country offices, include Indian health professionals with excellent capacity and knowledge of the country's broader health issues. The FAO office, which also has regional responsibilities for the South Asian region, includes Dr. Mohinder Oberoi, an Indian veterinarian, with excellent working relationships with key Indian officials in the animal health sector. Both WHO and FAO offices are providing important leadership and liaison roles for coordinating responses from the donor community.

The World Bank (WB) is currently implementing a large Integrated Disease Surveillance Project (IDSP), through which support for AI interventions are being prepared. One specific area of interest is in addressing the need for upgrading the number and effectiveness of regional laboratories for surveillance activities across a range of infectious diseases. The WB's Rural Development Division has recently added two Indian professionals on the animal health side to assist the GOI in increasing the effectiveness of the animal health surveillance and eradication program. The WB will be prepared to assist the GOI in providing support for logistics, planning and technical assistance. This aid could be targeted to improving the infrastructure of animal health laboratories, especially upgrading various aspects of the five regional laboratories such as facilities, equipment, reagents and kits for HPAI testing. As stated later in this report, it will be important for USAID investments for animal health to be closely coordinated with both the WB and FAO under the direction of the GOI. While this report concentrates heavily on the situational analysis from an animal health perspective, much can be learned from the excellent working relationships which USAID currently has in implementing program in the human health-related programs.

EXISTING USAID PLATFORM AND PROGRAMMATIC RELATIONSHIPS IN HUMAN HEALTH

USAID has a long, solid history of working in the human health and infectious disease sectors in India. Current USAID-supported programs addressing polio, tuberculosis, HIV/AIDS, as well as reproductive health and family planning programs nationally (tuberculosis and polio) in focus states through the GOI and with NGOs provides a broad platform of partnerships for which programming AI funds can be efficiently pursued. For example, the relationships with key Indian officials in many health-related agencies in New Delhi and in selected states (including Maharashtra) can be pursued for preparedness planning and coordination for any future outbreaks of AI in humans. The coordinating mechanisms and working relationships existing between USAID and these GOI agencies, along with key donors, WHO and the WB, appear to be very effective. Our interviews with leaders in the key national health agencies in New Delhi as well as in Pune (the National Institute of Virology) and the health officials for the State of Maharashtra reinforced the impression that these working relationships are effective and productive.

From the animal health perspective, USAID's modest portfolio on the agriculture side means that key relationships need to be developed. By focusing narrowly on the requirements highlighted to support a more rigorous surveillance and eradication system for bird flu, such relationships can be developed by combining efforts with those of the WB and FAO.

OTHER DONOR AGENCIES

The team also met with UNICEF (Mr. M. Galway and others), which is in the midst of developing key products for a national level Information, Education and Communications (IEC) strategy for an education and behavioral change program directly addressing AI issues. It is projected that these products will be ready for testing and dissemination in about two months. One of the team's recommendations is to work directly with the Poultry Federation of India on a complimentary IEC program, which should look to the UNICEF experience and products for applicability. DFID and EC representatives have indicated they are in the midst of their programming years and are considering what to do should additional resources become available for AI purposes. The EC Office, which is regional for the SARC (South Asia Regional Cooperation) countries, indicated that the bulk of future AI funding will likely be targeted for countries in the region considered to be much less capable—in both human capacity and financially—than India.

SYNERGY OF USAID WITH USG AGENCIES

Future USAID investments in animal health related to HPAI should include active participation with the USAID Economics and Agriculture Office. There will be an immediate need to analyze the recently completed WB/GOI field report, which covers national and local responses to HPAI outbreaks in the Maharashtra area during the last three months. It highlights the effectiveness of the planning documentation, implementation and adjustments required to improve the future efforts in planning and containment. The second requirement is to meet with the President of the Poultry Federation of India, Mr. Shashi Kapur, to determine the most efficient mechanism for USAID to directly support preparedness planning, including the beginning stages in the rehabilitation of the poultry industry.

Communication and information sharing with the USDA/FAS team have been good. One of the critical needs in the current GOI animal laboratory testing and surveillance system is the need for personnel training and upgrading laboratory capacity. Depending on available resources, short-term training at the USDA's premier animal laboratory in Ames, Iowa, would be a good investment of resources—one Indian professional is slated for such training this month.

The Embassy Science Office, staffed by Health and Human Services (HHS) and directing the work of the Centers for Disease Control technical assistance persons in India, plays a key role in coordinating the overall efforts of USG agencies. A good suggestion at the USAID exit briefing with this team was to combine efforts with the Embassy/HHS to carry out an assessment of USG resource programming to date that is focused on preparedness planning on the human health aspects of HPAI.

The team's experience has indicated that closer collaboration between USG agencies comes about when joint assessments (as suggested above related to human health) or collaborative efforts in programming USG resources are undertaken. A potential example for animal health relates directly to the need for rebuilding India's poultry sector. The rapid rise of the Indian poultry sector included long-term technology sharing with US corporations involved in the export of technologies related to poultry breeding and vaccines/biologicals. USAID and USDA interests would overlap on any USAID-funded program directed at such efforts.

FUTURE INVOLVEMENT IN ANIMAL HEALTH

Activities at the national level targeted toward containment efforts of HPAI in animals/birds will be directed by the Commissioner of Animal Husbandry, Dr. Bandopadhyaya. The establishment of the new Bird Flu Cell will come under his authority. Joint Secretary in Animal Husbandry, Upma Chawdhry, will also play an important role. Leadership on the donor side will come from the FAO and the World Bank. The WB has a strong analytical team in place; FAO has established strong relationships with the GOI animal health authorities.

The private poultry industry could become a more consistent partner in efforts in containing bird flu. The President of the Poultry Industry of India, Shashi Kapur, is a dynamic, able leader, with numerous ideas on how to approach various aspects of AI and has been called on by GOI leaders at various times during the past several months. Venkateshwara Industries (Venke) operates in almost a parallel manner to that of the 360 companies making up the Poultry Federation. With approximately 80 percent of the combined broiler and egg market in India, they are a dominant force on many of these issues. All of the above will be key players in any future USAID investments in the sector. The USAID Economics/Agriculture team will need to develop working relationships with these institutions and persons.

RECOMMENDED USAID INVESTMENTS

The criteria used for recommendations for USAID investments include the guidance contained in USAID/Washington Guidelines, the level of demand for inputs from the GOI as well as opportunities and demand from the commercial sector, and the timeliness for programming USAID funds (what actions can be taken tomorrow?).

1ST HIGHEST PRIORITY

Containing the spread of HPAI geographically, coupled with declining incidence rates in affected areas, is the highest priority at this time. From the previous analysis, the team concludes that the highest probability for containing HPAI in India now, and improving preparedness planning for future outbreaks, is an adjusted, more rigorous, integrated bird surveillance, testing (including improved laboratory infrastructure), and eradication system.

For these purposes, the GOI is likely to create a bird flu cell (the Cell) in the near future within the Department of Animal Husbandry, Fisheries and Dairying (DAFD). The Cell will become the coordinator and central focus of future efforts on the animal health side for containment of HPAI in poultry flocks. The World Bank and FAO are already supporting this concept and will become collaborators when the Cell is established. USAID should take part in this effort, which includes the investment of resources. USAID funds could be allocated to meet the costs of technical assistance required for the Cell. Donor grant funding will be a constraint. Becoming part of this effort will provide USAID with access to the latest developments and information regarding AI from the animal health side. This process could also provide USAID a “seat at the table” as policy or implementation adjustments for more effective containment actions are required.

The WB, in collaboration with DAFD staff, recently completed an analysis of preparedness planning and the early stages of implementation of containment measures following the officially reported bird flu outbreak in February 2006. The team has not seen the written report of that analysis, but was informed that there are several key insights for what adjustments are required for the overall GOI implementation plan. This report could provide further suggested areas for USAID grant funding. Discussions could begin immediately with all players mentioned above—the GOI/DADF, WB and FAO—as to the most efficient ways and means for USAID support. The USAID Office of Economic Development/Agriculture should be brought into this process, coordinated closely with the USAID/HPN Office leadership on AI issues within the Mission. Supporting improved containment of AI outbreaks in poultry is of the highest priority and USAID resources should contribute to this process.

2ND HIGHEST PRIORITY

The Indian commercial/private sector has driven the rapid expansion of the poultry industry for more than two decades. However, the evidence shows the commercial sector has not been brought into the AI preparedness planning/implementation process in a systematic manner. Assuming the Bird Flu Cell is established soon, this could also become a mechanism for a public/private partnership addressing bird flu issues more effectively. The Poultry Federation of India’s leadership has a number of good ideas how to pursue such a strategy. An initial concept is to establish a high profile Information, Education and Communications (IEC) strategy which would have two major objectives. The first is to establish a credible way to communicate real health risk analysis of the AI virus in poultry to a multi-targeted audience, including very high level officials. The failure to do this at the beginning of this year has caused unnecessary devastation to the industry, as mentioned previously. Secondly, but related to the first objective, the IEC strategy could become a communication tool for

beginning to rebuild/resurrect a poultry industry that has been badly damaged leading to major financial and employment losses and a number of reported suicides.

Such an IEC strategy would differ considerably from the UNICEF-led development of IEC programs among donors. The UNICEF products will focus largely on human health messages which become integrated with animal health at district and community levels. The UNICEF information products will become useful examples of how IEC products are developed and their effectiveness. We believe the Poultry Federation should be encouraged, even provided resources in some form of co-financing mechanism, to develop and implement such an IEC strategy.

Questions were raised why the commercial sector requires donor funds. Many of the 360 businesses making up the Federation have been devastated by the precipitous decline of the sector. The process of working directly with the commercial sector could also underline the absolute importance of developing an effective public-private partnership to (1) address the threat of AI and (2) make the transition to a “rebuilding the poultry sector phase.” The current President of the Federation, Mr. Shashi Kapur, has been a leading light on these issues. USAID should seek him out on the broader issues of the role of the private sector, as well as specific programming ideas. No other donor appears to be pursuing these kinds of relationships with the key leaders of the private poultry industry.

A 3RD AREA OF EXPLORATION

The role of migratory and wild birds in spreading the HPAI virus is likely the most plausible explanation for the introduction of AI in India. This theory is lent credence by the presence of a large wetlands area in Maharashtra, near the locations of initial outbreaks, which is a major migratory destination for birds in the West Asia Flyway. Developing an effective surveillance system for migratory birds would thus appear to be a high priority. European countries and others, already affected by the bird flu virus, have established such mechanisms in their preparedness and containment planning operations. Wetlands International and the Bombay Natural History Society (BNHC) are two organizations in India with proven track records for carrying out such operations; both are based in the Maharashtra region. Wetlands has developed a concept paper for such an operation which will include joint operations with BNHC. They are waiting to fully develop the proposal until there is some likelihood of donor funding interest. The team recommends this concept and pending proposal be brought to the attention of the USAID regional office in Bangkok for potential funding. The regional nature of analyzing the role of migratory birds and their role in spreading AI would lend itself to such funding considerations.

Finally, in the process of becoming more engaged on the animal health side of avian influenza and hopefully joining the “team” of players/donors led by the new Bird Flu Cell, additional opportunities for critical investments of resources will become more obvious. Complementing other donors’ activities in an AI containment strategy and program directly relates to USAID/Washington guidance and will contribute to the GOI’s goals and objectives for effectively limiting the spread of avian influenza.

ANNEX 1: LIST OF PERSONS/ORGANISATIONS CONSULTED

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